

FACTORS AFFECTING TIME, COST AND QUALITY MANAGEMENT IN BUILDING CONSTRUCTION PROJECTS

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ABSTRACT

The study is an assessment of time, cost and quality management in the Nigerian construction industry, and it aims to explore time cost and quality management in the construction industry. The objective of the study is to identify factors affecting time; cost and quality management in building construction projects. This study is limited to the view of a convenient sample of professionals in the building construction industry. The method used to collect data were questionnaire and interview while the data collected were subjected to descriptive statistical analysis using percentage, mean score and frequency. It was observed that planning and scheduling deficiencies, fraudulent practice and kickback and absence of clear Evaluation standards are the major factors affecting time, cost and quality in construction project. The study recommends that construction team should strive to ensure effective management of time, cost and quality in building production.

INTRODUCTION

Client when engaging professionals for the purpose of procuring a building or other infrastructure are primarily concerned about quality, time, and cost. Quality being the perceived project outcome based on prescribed production information; time being the expected duration for safe project delivery; and cost being the monetary outcome relating to quality i.e. cost of achieving the quality of a project (Elamah, 2006).

Research carried out by Bowen, et al (2007) has shown that most construction project are procured on the basis of only two of these parameters i.e. time and cost. This is understandable since the majority of the project management control systems highlight time and cost, and overlook the relative importance of quality (Hughes, Hillebrandt and Murdock, 2000). Similarly, Herbsman and Ellis (1991) argued that the main problems in traditional approaches to project delivery have been in extensive delays in the planned schedules, cost overruns, serious problems in quality, and an increase in the number of claims and litigation associated with construction projects.

In order to plan and manage a successful project, the three project parameters of time, cost and quality should be carefully put into cognizance (Marion 1996). In arguing for the consideration of the three project parameters in attaining client's basic objective, Bowen, et al (2007) propose that the project parameters are the three points of a triangle and that neglecting one factor will have a corresponding detrimental effect upon the other two. In support of this fact, a study conducted by Lansley (1994) argued strongly for the importance of studying the behavioural aspect of management in attempting to address problems facing the construction industry. Bowen, et al (2007) asserted that little evidence exists of successful project where the three project parameters have been balanced and there is a need to embrace time, cost and quality management as a human activity system.

Bamisile (2004) opined that Nigerian public at large, believe that most building projects fails to offer value for money, construction projects are said to cost too much, take too long to complete and too prone to failure, therefore, this research seeks to explore the management of three project parameter, (time, cost and quality) in the Nigerian construction industry.

Ibironke (2007) asserted that problems experienced in the course of managing the three parameters, manifest primarily at two points in the total building process: At the interface between the client and designer and the interfaces between the designer and the contractor. Ibironke (2007) further concludes that major problems of project failing to meet with the client requirement of Time, Cost and Quality (TCQ) include the followings.

- i. Client and designer may misunderstand or not agree on the detail of the brief with regards to the buildings purpose performance or appearance.
- ii. The designer and contractor may through misunderstanding or ignorance, misinterpret the objectives regarding time, cost and quality specified in the relevant contract document.
- iii. Designer sometime may design a building that cannot be built to the required levels of quality, constructed within time and cost.

The concept of managing construction according to Bowen et al, (2007) is deeply in the traditional building procurement system. Ireland (1983) argues that time cost and quality are the principal feasible objectives of the client in any construction project. Although it is claimed that time, cost and quality are incorporated in the management of construction project. Therefore, the question that is proposed to give focus to this paper goes like: What are the factors affecting time cost and quality management in building construction project in Nigeria? To this end, the objective of this paper is to identify factors affecting time, cost and quality management in building construction project in Nigeria.

Several authors have identified factors affecting time and costs, such authors include Chan and Kumaraswamy (1996); Bromilow, Hinds and Morty (1988); Hughes, Hillebrandt and Murdock (2000); Walker and Shen (2002); and Ogunsemi (2002). From those studies, it is clear that, for the client to have value for his project, it is important to critically look at the three basic project parameters of time, cost and quality. Although efforts have been made by some authors in this regard there is the need to carry out an assessment of time, cost and quality management on building projects in the Nigerian construction industry; hence the need for this paper.

FACTORS AFFECTING TIME (DURATION) IN CONSTRUCTION PROJECT

Henry, Jackson and Bengt, (2007) asserted that various factors have been identified by different researchers from the time aspect in different construction industries. Lack of materials, incomplete drawing, incompetent supervisors, lack of tool and equipment, absenteeism, poor communication, poor site layout, inspection delay and rework were found to be the most significant problems affecting project duration (time).

Olomolaiye, Jayawardane and Harns (1988) have identified five most significant factors affecting time management in the Nigerian construction industry. They are lack of materials, rework, equipment, supervision delays, absenteeism and interface. Lack of material, weather, and physical site conditions, lack of proper tool and equipment, design, drawing and change orders inspection delay, absenteeism, safety, improper plan

of work, repetitive work, changing crew size and labour turnover were found to be the most critical factors in Iran (Henry et al 2007). Elinwa and Joshua (2001) also identified mode of financing and payment for completed works, improper planning, and underestimation of time/duration for projects as major factors responsible for time-overrun in Nigerian construction industry.

FACTORS AFFECTING COST IN CONSTRUCTION PROJECT

The ability to accurately predict the client's financial commitment to a project, which also forms the basis of the contractor's eventual revenue, has many advantageous implications. As a pre-warning indicator, alternative courses of actions can be examined and provision can be made for the preferred option (Ibironke, 2003). The client according to Ibironke (2003) has the capital and related interests to consider often with no prospect of a financial return until full completion of the project. For large project, consisting of independent units and for situations where a number of projects are concurrently running, an indication of an overall cost that can be committed is crucial.

In 1968 the Division of Building Research Organization in Melbourne identified the notable variation within project cost and duration (Bromilow, Hinds and Morty, 1988). Bromilow et al (1988) confirmed that the relationship between project cost and duration indicated a high level of instability. The factors identified by contractors affecting cost and time in a survey carried out by Mansfield et al (1994) include the following: price fluctuation, inaccurate estimates, delay (time overrun), additional work, fraudulent practice and kick backs, shortening of contract period, construction method, poor contract management, subcontractors and nominated suppliers, mistake during construction and non-adherence to contract condition.

FACTORS AFFECTING QUALITY IN CONSTRUCTION PROJECTS

The first step in quality as defined by Bamisile (2004) is the definition of customer's needs and expectations which must be translated into clearly defined and measurable requirements for building construction projects. The briefing stage demands active co-operation of the client, the United Kingdom Building of National Economic Development Office (NEDO) (1987) stressed the importance of the client's involvement in all phases of a building project and provides a checklist as a frame work for development of the initial brief. Equally important to client in achieving best value in building construction is the procurement and tendering process. The comprehensiveness of tender documents, the time allowed for preparing a tender and the selection of tenders are some of the key issues that required changes and new ideas.

Elamah (2006) further stressed that designer have not matched the advancement and changes in the roles of the client with the same improvement in their own performance. The object of design and the preparation of production information are to express client requirements clearly and in measurable terms. Therefore, because of the greater number of people involved in both the preparation and use of production information, there is an increased risk of misunderstanding and oversight. The quality and co-ordination of the production information and inadequacies in production information have been identified by NEDO (1985) committee report as some of the factors affecting quality.

Production information is the medium through which clients quality requirement are communicated to contractors so that the client may obtain satisfaction from their buildings (Bamisile, 2004). Production information must be right and presented in such

a way that compliance can be checked. Pateman (1986) asserted that quality must be measurable otherwise the constructor cannot know whether or not he has got it, therefore quality must be defined in measurable form as obtained or specified in the production information. Similarly, Bamisile (2004) drew attention to the fact that good design embraces such things as getting a proper brief, ensuring the design matches the client requirement, prescribing the best material for the job and making sure that what is inked in the drawing can be built on the site.

Another perspective which the factors affecting quality in construction can be looked at is the construction stage. In majority of cases the complete construction implication are not shown at the tender stage due to the scanty level of information issued as tender document. Also the time allowed for tendering process is often very short. Bamisile (2004) observes that subcontractors usually have even shorter space of time to consider these implications when they submit their bid. He further stressed that ambiguous items in the tender documents are often not clarified by both the contractors and their subcontractor which often results in contractors not allowing sufficient money in the tender to cover the perceived quality requirement and the necessary overhead required to carryout the project.

Bamisile (2004) argued that only the contractor has the responsibly and power to achieve specified standard. Experience suggests that the contractor's inspection and control arrangement are rarely sufficient for any contract. Casual inspection methods are not likely to be effective and could leave large section of defective work until when it becomes unreasonable to remove them. The various steps that should be followed in order to achieve specified quality standard at first attempt are often not adhere to by the project team (Elamah, 2006). Such steps are construction methodology, construction programmes, site layout, plant and equipment analysis etc.

METHODOLOGY

Relevant and necessary data were collected through questionnaires and scheduled interviews so as to achieve the objective which is to identify factors affecting time, cost and quality management in building construction projects. The questionnaire was administered to Architect, Builders, Quantity Surveyors, Contractors, Engineers and client in Edo state of Nigeria. All the professional respondents (i.e. Architects, Builders, Quantity Surveyors and Engineers) were qualified professionals who on many occasions have been involved in one project or another. 150 questionnaires were distributed and 122 representing 81% were received back while 100 were filled correctly, this represents 66.7% of the total distributed and 82% of total received, hence 100 questionnaires were analyzed. The data such obtained were subjected to descriptive statistical analysis by the use of percentage, mean score and frequency.

DATA ANALYSIS

Table 1 is the breakdown of the categories of the respondents. The results indicate that Architects form the highest number (20%) among the respondents while Client forms the lowest number (15%).

Table 2 displayed the years of working experience of the respondents. The mean years of working experience of respondent is approximately 11, which depicts that they are competent enough to supply reliable and up to date data needed for the study.

Table 3 shows the number of projects the respondents have handled or have been involved in. The mean project involved or handled by respondent is 10, which signifies

that they are experienced enough to provide reliable and up to date information required for the purpose of the study.

Table 4 is the analysis of the responses of the professionals as regards factors affecting time. The highlights indicates that planning and scheduling deficiencies is a major factor affecting time and this had a mean score of 4.19, followed by labour shortage, change in design, slow decision making, delay in work approval and others.

Table 5 is the analysis of the responses of the professionals as it regards factors affecting cost. The results shows that fraudulent practice and kickbacks with a mean score of 3.78 is a major factor affecting cost management followed by poor contract management, other factors includes mistakes and discrepancies in contract documents, deficiencies in cost estimates.

Table 6 is the analysis of the responses of the professionals as it concerns factors affecting quality. The results indicates that Absence of clear uniform evaluations standard was rated high with a mean score of 3.86, while unexpected geological condition. Weather, confined site etc. were rated least compared to other factors.

Table 1: Respondent professional/personality

Professional/personality	frequency	percentage %
Architect	20	20%
Builders	18	18%
Quality surveyors	18	18%
Contractors	15	15%
Client	14	14%
Engineer	15	15%
Total	100	100%

Table 2: Respondents years of working experience

Year	Frequency
1 – 5	30
6 – 10	25
11 – 15	19
16 – 20	15
Above 20	11
Total	100

Mean (M) = 10.53

Table 3: Respondent number of project handled or involved.

Year	Frequency
1 – 5	30
6 – 10	28
11 – 15	18
16 – 20	12
Above 20	12
Total	100

Mean (M) = 10.40

Table 4: Factors affecting time

S/No.	Factor	5	4	3	2	1	M/S	Ranking
1.	Planning and scheduling deficiencies	280	76	39	24	0	4.19	1
2.	Labour shortage	120	132	57	32	2	3.43	2
3.	Design change	210	52	63	10	6	3.41	3
4.	Slow decision making	55	156	57	46	8	3.22	4
5.	Delay in work approval	100	80	135	4	0	3.19	5
6.	Waiting for information	25	152	105	18	13	3.13	6
7.	Delay in inspection and testing of work	110	80	183	0	2	2.88	7
8.	Deficiencies in organization	10	88	183	0	2	2.83	8
9.	Incomplete drawings	15	104	99	62	0	2.80	9
10.	Insufficient number of equipment	30	68	150	28	2	2.78	10
11.	Shortage of construction material	0	84	147	36	3	2.70	11
12.	Problem with neighbours	70	36	78	26	25	2.35	12
13.	Late delivery	0	28	108	14	35	1.83	13

Table 5: Factors Affecting Cost

S/No.	Factors	5	4	3	2	1	M/S	Ranking
1.	Fraudulent practice & kickbacks	195	116	39	26	2	3.78	1
2.	Poor contract management	180	48	99	24	7	3.58	2
3.	Mistakes and discrepancies in contract document	50	180	87	28	0	3.53	3
4.	Deficiencies in cost estimates	10	216	87	30	0	3.43	4
5.	Changes in design	110	64	81	60	5	3.20	5
6.	Construction methods	60	96	132	16	12	3.18	6
7.	Escalation of materials prices	55	128	87	40	8	3.18	6
8.	Change in site conditions	50	160	69	14	14	3.07	8
9.	Labour and management relation	45	64	165	16	12	3.02	9
10.	Financing and payment completed work	115	80	39	58	9	3.01	10
11.	Monthly payment difficulties	35	84	93	48	5	2.65	11
12.	Weather	104	0	96	42	15	2.57	12
13.	Shortage of material	70	40	57	40	31	2.38	13

Table 6: Factors affecting quality

S/No.	Factor	5	4	3	2	1	M/S	Ranking
1.	Absence of clear uniform evaluation standard	190	108	15	60	10	3.86	1
2.	Inadequate control procedure	125	185	54	14	4	3.81	2
3.	Deficiencies in coordination	78	80	81	42	0	3.55	3
4.	Material management problem	125	72	132	26	0	3.55	3
5.	Mistake during constructions	50	64	168	18	0	3.36	5
6.	Ignorance on the part of the designer about client requirement	120	38	15	50	14	3.27	6
7.	Non adherence to contract condition	15	168	102	16	17	3.12	7
8.	Frequent equipment breakdown	104	45	96	42	15	3.02	8
9.	Ineffective communication	45	100	165	16	12	3.02	8
10.	Incomplete drawings	0	84	147	36	18	2.85	10
11.	Shortage of technical personnel	35	84	168	4	14	2.80	11
12.	Weather	70	36	77	25	38	2.46	12
13.	Confined site	70	40	57	40	34	2.42	13
14.	Unexpected geological condition	0	28	108	14	55	1.93	14

INFERENCE FROM THE RESULTS

The result collated from the questionnaire administration revealed that planning and scheduling deficiencies on the part of the construction team is considered a major factor affecting time (duration) by the respondent with a mean score of 4.19. The respondents are of the opinion that ineffective planning and scheduling for construction work much later adversely the construction time. Other factors considered very important include labour shortages which mean that when there is a shortage of the required manpower, work will not proceed according to plan therefore more time required completing the project. Design change is another factor ranking next to labour shortage.

For the factors affecting cost, fraudulent practice and kick backs is a major factor with a weighted mean score of 3.78, fraud is a major problem in the Nigerian economy today and its effect is also felt in the construction industry, with this practice contractors and client representatives either inflate contract figures or work together to defraud the client especially in government contract (from interview conducted). Another factor ranking next to fraudulent practices and kick backs is poor contract management; the research further shows that shortage of material rank least on the factors affecting cost.

In the case of quality, absence of clear uniform evaluation standard is considered as a major factor affecting quality management in construction with a weighted mean score of 3.83. From the interview conducted the respondents asserted that the issue of quality is dependent on the circumstances peculiar to a particular project. The respondent further stress that quality standards are difficult to establish and as such what constitutes quality in building often times is a subjective concept which like a beauty is in the eyes of the beholder, unexpected geological condition was seen as insignificant may be because it rarely occur in most site operations.

CONCLUSION

Based on the data presented and analyzed on the assessment of time cost and quality management in the Nigeria construction industry. The study concludes that the major factor affecting time cost and quality are planning and scheduled deficiencies, fraudulent practice and kickback, and absence of clear uniform evaluation standards. The study also shows that the impact of non compliance with time, costs quality management procedures is building collapse as evident in the constructions industry today. Other includes high cost of construction, which makes building constructions very high thus leading to project abandonment which constitute nuisance to the built environment and this lead to loose of public confidence in the industry. Conclusively the study further re-affirms the importance of effective management of time cost and quality in the building construction industry.

RECOMMENDATION

Based on the conclusion drawn above the following recommendations are hereby proposed. Efforts should be made by the construction team to plan all work operation activities regarding any project, starting from the pre-contract stage, through to the post contract stage. Also modalities should be put in place by government and concerned professional bodies to guide against fraud, the relevant authority like SON (Standard Organization of Nigeria) should wake up from slumber and come up with standards for construction component. The National building code should be adopted for use in the building construction in all it ramifications. Consultant and contractors should strive to

ensure effective management of time, cost and quality management in building construction industry.

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